

Mastitis in Lactating Women

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DR. KAREN OGLE (*Associate Director, Family Practice Residency*): Mastitis is a common problem for lactating women and is particularly prevalent in the subset of breast-feeding problems that present to a physician. The family physician is in an ideal position to diagnose and treat mastitis (as well as many other problems of breast-feeding), as he or she is likely to care for the "nursing couple," the mother and the infant. A new kind of health professional, the certified lactation consultant, may also figure prominently in the care of the breast-feeding dyad. When a breast-feeding difficulty arises that cannot be overcome by the usual changes in lactation management, a lactation consultation may be in order. Susan Davis, a certified lactation consultant in our community, will participate in our discussion today. In this Grand Rounds, we will begin with an overview of the problem of mastitis before going on to three case presentations.

Mastitis is the clinical term for a wide range of inflammatory disorders of the breast. Nonpuerperal mastitis generally represents a ductal abnormality or local manifestation of a systemic process. Epidemic puerperal mastitis is a virulent staphylococcal disease that was seen primarily in the preantibiotic era. This discussion will focus primarily on sporadic puerperal mastitis, a condition that has been well described, and that probably includes a spectrum of poorly understood pathophysiologic processes.

Definitions are difficult to agree upon. Lawrence¹ provides a somewhat rigorous definition: "fever of 38.5 °C or more, chills, flu-like aching, systemic illness, and [a] pink, tender, hot, swollen, wedge-shaped area of the breast." This condition is differentiated from a plugged duct by the suddenness of onset, fever, systemic symptoms, and local findings. Local findings can be quite pronounced without systemic symptoms. The converse is also true, however. Indeed, some experts believe that there is

usually an inverse relationship between the two, ie, the more severe the local findings, the less marked the systemic symptoms.²

Thomsen and colleagues^{3,4} have reported interesting work and have categorized these breast problems into three clinical entities: (1) milk stasis, (2) noninfectious inflammation, and (3) infectious mastitis. These three categories are matched with laboratory findings of breast milk as shown in Table 1.

FAMILY PRACTICE RESIDENT: How common is mastitis?

DR. OGLE: This question is difficult to answer. There is general agreement among the experts that the frequency is usually underestimated, and that many cases go unreported to physicians. Riordan,² in her survey of La Leche members, found that 50 percent of the episodes of mastitis involved no physician contact. In her nonrandom sample, 26 percent of the women had experienced mastitis. In a larger study, Marshall et al⁵ found an incidence of 2.5 percent (61 of 2,534 women).

FAMILY HEALTH CENTER NURSE: When does mastitis most frequently occur?

DR. OGLE: Most experts agree that the majority of cases occur in the first two months postpartum, with a peak in the first two weeks. In Riordan's sample, 47.8 percent of the cases occurred between two and six months, and mastitis is not infrequent among mothers nursing toddlers.

FAMILY PHYSICIAN: How does the infection enter the breast?

DR. OGLE: Several theories have been proposed. Dr. Lawrence¹ has described three models for the portal of entry: (1) through the lactiferous ducts into a lobule, (2) through a nipple fissure into the periductal lymphatic system, and (3) through hematogenous spreading. These three different mechanisms help to explain the different clinical manifestations of the problem.

Let's have the first case presentation.

DR. MARK POVICH (*Third-Year Family Practice Resident*): B.Z. was a 16-year-old single mother when she nursed her first child. She and her baby were living with B.Z.'s grandmother, who had been supportive of her decision to keep the baby but who had no experience with nursing. She greeted all problems, including B.Z.'s struggle

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TABLE 1. CATEGORIES OF PATIENTS WITH INFLAMMATORY BREAST SYMPTOMS*

| Symptom | Leukocytes per Milliliter of Milk | Bacteria per Milliliter of Milk |
|----------------------------|-----------------------------------|---------------------------------|
| Milk stasis | <10 ⁶ | <10 ³ |
| Noninfectious inflammation | >10 ⁶ | <10 ³ |
| Infectious mastitis | >10 ⁶ | >10 ³ |

* From Thomsen et al^{3,4}

with very sore nipples, with the observation that bottles would be easier. Two weeks after the birth, B.Z. noted a hard spot in the upper outer quadrant of her right breast, which became tender and red over the course of the day. Fearing even more reinforcement of switching to bottle-feeding, she said nothing about the problem. As her right breast became more painful, she stopped nursing the baby on that side. Over the course of the weekend, her breast became hard and swollen. Her temperature rose. On Sunday evening, her grandmother noted a shaking chill and took her oral temperature, which was 39.6 °C. On examination in the emergency room, a 4 × 6-cm breast abscess was found on the right side.

DR. OGLE: A theme in all three of our case presentations today will be the importance of patient education in breast-feeding, in particular, an understanding of the potential complications and their management. Women who have attended La Leche meetings or prenatal breast-feeding classes are far more likely to recognize the early signs and symptoms of mastitis and to initiate appropriate treatment.

SUSAN DAVIS (*Certified Lactation Consultant*): Whenever a nursing mother has a fever, local pain, and heat or redness in the breast, intervention is needed. In addition, the more common conditions of sore nipples and plugged ducts should receive attention, not only for the immediate problems they present, but also to prevent the possibility of mastitis.

DR. OGLE: Fortunately, abscesses are an infrequent complication of mastitis. They are most often associated with weaning, and generally require surgical drainage followed by the use of a breast pump on the affected side until healed. Devereux⁶ found an overall incidence of abscesses in 11.1 percent of women with mastitis. In a study by Marshall et al,⁵ 4.6 percent of women with mastitis developed abscesses, an event occurring exclusively in women attempting to wean.

MS. DAVIS: This correlation to weaning illustrates the importance of draining the breast during the treatment of mastitis. Even those women who may be so discouraged by the mastitis that they have considered quitting nursing must be urged to delay weaning until the problem has

resolved. If they do not, they greatly increase their chances of developing an abscess.

DR. OGLE: Our second case presents a different course of illness.

DR. KATHY MUIRURI (*Assistant Professor, Department of Family Practice*): A.R. was a 32-year-old married woman nursing her first baby, who was 11 weeks old when she encountered difficulties. Nursing had gone well after some minor problems with nipple soreness in the first week. She began to feel feverish and noted generalized muscle aching in the late afternoon. She called her family physician's office and spoke with the nurse, who suspected a developing viral illness. She advised rest and suggested that Mr. R. give the baby a bottle during the night so that Mrs. R. could "sleep through." The couple followed this advice, but by 4 AM Mrs. R.'s oral temperature was 39.8 °C. She had shaking chills and noted erythema over the upper outer quadrant of her left breast, which was very tender.

FAMILY HEALTH CENTER NURSE: This case is a classical example of a maxim I learned at La Leche myself many years ago: "Flu in a nursing mother is mastitis until proven otherwise."

MS. DAVIS: This adage is certainly true. Many nursing mothers fail to associate flu-like symptoms with lactation.

DR. OGLE: And so do many physicians, unfortunately.

MS. DAVIS: This case again illustrates the importance of education for both nursing mothers and health care providers. In many cases early conservative action results in the resolution of the problem.

FAMILY PRACTICE RESIDENT: What early measures would you recommend?

MS. DAVIS: The early management of mastitis involves frequent nursing, bed rest, and consulting a physician. The lactating mother should nurse often, every one to two hours, followed by gentle expression or pumping, if necessary, to keep the breast well drained. If the inflamed breast is too painful to initiate feeding, the mother can nurse on the unaffected side until letdown occurs, then switch to the sore breast. Hot compresses should be applied, particularly before nursing, and she should drink plenty of fluids.

If milk stasis, resulting from a plugged duct or engorgement, is suspected, the mother may be instructed to immerse her breasts by leaning over a basin of very warm water before breast-feeding. Some mothers have found that assuming a hands-and-knees position and allowing the breasts to fall free is quite effective; a mother may choose to nurse in this position if it is more comfortable. Another technique for severe discomfort has the mother lying on her side in a tub of hot water with the inflamed breast lower down and floating.⁷

DR. OGLE: In addition to these conservative measures, the physician must try to evaluate the need for antibiotics.

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The onset of chronic active hepatitis may be insidious, and patients receiving long-term therapy should be monitored periodically for changes in liver function. If hepatitis occurs, the drug should be withdrawn immediately and appropriate measures taken. Peripheral neuropathy, which may become severe or irreversible, has occurred. Fatalities have been reported. Conditions such as renal impairment (creatinine clearance under 40 ml per minute), anemia, diabetes mellitus, electrolyte imbalance, vitamin B deficiency, and debilitating disease may enhance the occurrence of peripheral neuropathy. Cases of hemolytic anemia of the primaquine sensitivity type have been induced by nitrofurantoin. Hemolysis appears to be linked to a glucose-6-phosphate dehydrogenase deficiency in the red blood cells of the affected patients. This deficiency is found in 10 percent of Negroes and a small percentage of ethnic groups of Mediterranean and Near-Eastern origin. Hemolysis is an indication for discontinuing Macrodantin; hemolysis ceases when the drug is withdrawn. **PRECAUTIONS: Drug Interactions:** Magnesium trisilicate, when administered concomitantly with Macrodantin, reduces both the rate and extent of absorption. The mechanism for this interaction probably is adsorption of drug onto the surface of magnesium trisilicate. Uricosuric drugs such as probenecid and sulfapyrazone may inhibit renal tubular secretion of Macrodantin. The resulting increase in serum levels may increase toxicity and the decreased urinary levels could lessen its efficacy as a urinary tract antibiatic. **Carcinogenesis, Mutagenesis:** Nitrofurantoin, when fed to female Holtzman rats at levels of 0.3% in a commercial diet for up to 44.5 weeks, was not carcinogenic. Nitrofurantoin was not carcinogenic when female Sprague-Dawley rats were fed a commercial diet with nitrofurantoin levels at 0.1% to 0.187% (total cumulative, 9.25 g) for 75 weeks. Further studies of the effects of chronic administration to rodents are in progress. Results of microbial *in vitro* tests using *Escherichia coli*, *Salmonella typhimurium*, and *Aspergillus nidulans* suggest that nitrofurantoin is a weak mutagen. Results of a dominant lethal assay in the mouse were negative. **Impairment of Fertility:** The administration of high doses of nitrofurantoin to rats causes temporary spermatogenic arrest; this is reversible on discontinuing the drug. Doses of 10 mg/kg or greater in healthy human males may, in certain unpredictable instances, produce slight to moderate spermatogenic arrest with a decrease in sperm count. **Pregnancy:** The safety of Macrodantin during pregnancy and lactation has not been established. Use of this drug in women of childbearing potential requires that the anticipated benefit be weighed against the possible risks. **Labor and Delivery:** See CONTRAINDICATIONS. **Nursing Mothers:** Nitrofurantoin has been detected in breast milk, in trace amounts. Caution should be exercised when Macrodantin is administered to a nursing woman, especially if the infant is known or suspected to have a glucose-6-phosphate dehydrogenase deficiency. **Pediatric Use:** Contraindicated in infants under one month of age. (See CONTRAINDICATIONS.) **ADVERSE REACTIONS: Gastrointestinal:** Hepatitis, including chronic active hepatitis, and cholestatic jaundice occur rarely. Nausea, emesis, and anorexia occur most often. Abdominal pain and diarrhea are less common gastrointestinal reactions. These dose-related reactions can be minimized by reduction of dosage. **Respiratory:** Chronic, subacute, or acute pulmonary hypersensitivity reactions may occur. Chronic pulmonary reactions are more likely to occur in patients who have received continuous treatment for six months or longer. Malaise, dyspnea on exertion, cough, and altered pulmonary function are common manifestations which can occur insidiously. Radiologic and histologic findings of diffuse interstitial pneumonitis or fibrosis, or both, are also common manifestations of the chronic pulmonary reaction. Fever is rarely prominent. The severity of chronic pulmonary reactions and their degree of resolution appear to be related to the duration of therapy after the first clinical signs appear. Pulmonary function may be impaired permanently, even after cessation of therapy. The risk is greater when chronic pulmonary reactions are not recognized early. In subacute pulmonary reactions, fever and eosinophilia occur less often than in the acute form. Upon cessation of therapy, recovery may require several months. If the symptoms are not recognized as being drug-related and nitrofurantoin therapy is not stopped, the symptoms may become more severe. Acute pulmonary reactions are commonly manifested by fever, chills, cough, chest pain, dyspnea, pulmonary infiltration with consolidation or pleural effusion on x-ray, and eosinophilia. Acute reactions usually occur within the first week of treatment and are reversible with cessation of therapy. Resolution often is dramatic. **Neurologic:** Peripheral neuropathy, which may become severe or irreversible, has occurred. Fatalities have been reported. Conditions such as renal impairment (creatinine clearance under 40 ml per minute), anemia, diabetes mellitus, electrolyte imbalance, vitamin B deficiency, and debilitating diseases may increase the possibility of peripheral neuropathy. Less frequent reactions, of unknown causal relationship, are nystagmus, dizziness, headache, and drowsiness. **Dermatologic:** Exfoliative dermatitis and erythema multiforme (including Stevens-Johnson Syndrome) have been reported rarely. Transient alopecia also has been reported. **Allergic Reactions:** Lupus-like syndrome associated with pulmonary reaction to nitrofurantoin has been reported. Also, angioedema, maculopapular, erythematous or eczematous eruptions, urticaria, rash, and pruritis have occurred. Anaphylaxis, sialadenitis, pancreatitis, arthralgia, myalgia, drug fever, and chills or chills and fever have been reported. **Hematologic:** Agranulocytosis, leukopenia, granulocytopenia, hemolytic anemia, thrombocytopenia, glucose-6-phosphate dehydrogenase deficiency anemia, megaloblastic anemia, and eosinophilia have occurred. Cessation of therapy has returned the blood picture to normal. Aplastic anemia has been reported rarely. **Miscellaneous:** As with other antimicrobial agents, superinfections by resistant organisms, e.g., *Pseudomonas*, may occur. However, these are limited to the genitourinary tract because suppression of normal bacterial flora does not occur elsewhere in the body. **OVERDOSAGE:** Occasional incidents of acute overdosage of Macrodantin have not resulted in any specific symptoms other than vomiting. In case vomiting does not occur soon after an excessive dose, induction of emesis is recommended. There is no specific antidote, but a high fluid intake should be maintained to promote urinary excretion of the drug. **DOSEAGE AND ADMINISTRATION:** Macrodantin should be given with food to improve drug absorption and, in some patients, tolerance. **Adults:** 50-100 mg four times a day—the lower dosage level is recommended for uncomplicated urinary tract infections. **Children:** 5-7 mg/kg of body weight per 24 hours, given in four divided doses (contraindicated under one month of age). Therapy should be continued for one week or for at least 3 days after sterility of the urine is obtained. Continued infection indicates the need for reevaluation. For long-term suppressive therapy in adults, a reduction of dosage to 50-100 mg at bedtime may be adequate. See WARNINGS section regarding risks associated with long-term therapy. For long-term suppressive therapy in children, doses as low as 1 mg/kg per 24 hours, given in a single or in two divided doses, may be adequate. 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Certainly many women recover well without antibiotic treatment, but predicting which patients will fall into this category is not always easy. I generally use antibiotics in all women with fever and in those for whom conservative treatment does not lead to improvement within 12 to 24 hours. Other factors, such as inadequate follow-up and patient compliance, may dictate more aggressive antibiotic therapy, as they do in many other clinical problems.

FAMILY PRACTICE RESIDENT: What additional steps would you take if the patient were as sick as Mrs. R.?

DR. OGLE: At this point, antibiotics are generally indicated. Treatment should be guided by knowledge of the bacteriology of the disease. The most common organism associated with mastitis is *Staphylococcus aureus*. *Escherichia coli* and *Streptococcus* species have also been implicated, and new evidence points to a role of anaerobes. Dicloxacillin and the cephalosporins are the most frequently recommended antibiotics, though some authors consider erythromycin to be adequate coverage. These clinical experts recommend a full ten-day course to reduce the risk of recurrences.^{1,2,7}

DR. DUANE WARREN (Clinical Pharmacologist): Dicloxacillin is the most specific treatment for most cases, but as generic first-generation cephalosporins become available, cost comparisons may become significant. Both drugs are considered safe during lactation by most clinicians. Cephalexin is excreted into breast milk in low concentrations, with milk levels averaging 0.5 g/mL (therapeutic range in serum, 2 to 64 g/mL). Although no specific problems have been reported, modifications of the infant's bowel flora and any direct effects on the infant (ie, allergy) must be kept in mind. No data are available on the excretion into milk of the semi-synthetic penicillins. Extensive experience indicates no major contraindications to dicloxacillin, though the cautions cited with the cephalosporins would still apply.

MS. DAVIS: Following antibiotic therapy, infection of the nipples by *Candida albicans* is not uncommon. If the mother develops either sore nipples or breast pain, the possibility of such an infection should be considered.

DR. OGLE: Topical treatment for the mother is best when combined with oral nystatin for the infant to eradicate this problem.

FAMILY PRACTICE RESIDENT: Is it safe for the baby to be drinking milk with pathogenic bacteria in it?

DR. OGLE: Although the questions of the relationship of actual pathogens in the milk to mastitis and the possible protective effects of maternal antibodies are unsettled, experts agree that there is no risk to the infant when continuing to nurse during sporadic puerperal mastitis.^{1,2,5,7}

The exception to this rule is when bilateral mastitis is noted. Lawrence cites a case in which an infant infected with streptococcal disease at birth was treated with anti-

biotics.¹ Six weeks later, the mother developed bilateral mastitis, and the infant became ill. Cultures of both the infant and the breast milk grew out *Streptococcus* organisms. Two similar cases were reported. All three mothers had bilateral mastitis, a rare condition. The author suggests that bilateral mastitis be viewed with suspicion, and that caution in infant feeding be exercised.

We have one final case presentation.

DR. DIANE PLYLER (*Family Practice Resident*): T.D. was a 24-year-old married woman nursing her second baby. Nursing had been well-established for several weeks when she first noted mild tenderness in the lower outer quadrant of her left breast. Because her childbirth class had devoted three hours to breast-feeding and associated problems, she suspected a plugged duct and possible early infection. She immediately increased her fluid intake, asked her mother to come over to help her with her older child so she could get extra rest, and put hot compresses over the sore area on her breast.

She started nursing her infant on the sore left breast at each feeding. By the following morning, she felt well. Three days later, the problem recurred and was again resolved by her treatment. One week later, she developed similar symptoms, and concerned about other factors, she made an appointment with her family physician.

FAMILY PRACTICE RESIDENT: This case certainly seems to demonstrate the effectiveness of the early treatment you described in reducing the chances of progression, but what about her recurrences? I wouldn't know how to approach this problem if she came in to see me.

MS. DAVIS: Recurrences of a mild problem, such as T.D.'s, are most likely related to the basic predisposing factors for mastitis in general. These factors are widely agreed upon, although there is little hard evidence of their importance. Some factors contribute to the inadequate draining of the breast, which is thought to be one of the basic underlying problems. Plugged or poorly emptying ducts or lobules, poor letdown, pressure constriction (eg, from a poorly fitting bra), improper positioning of the infant at the breast, or ineffectual sucking all contribute to the development of mastitis, and overdistention or engorgement may also contribute. After the first week of infancy, engorgement is most commonly brought on by a missed feeding (such as when the baby starts to sleep through the night) or mother-infant separations. Erratic toddler nursing may begin fluctuations in the milk supply, causing a problem for some mothers. Other common predisposing factors are fatigue and stress, which lower maternal defenses. In T.D.'s case, I suspect that constriction of her breast, either because of infant positioning, the fit of her bra, or other pressure, may be the underlying problem. Adequate rest should be part of the recovery plan.

DR. PLYLER: In fact, a change in bra style seemed to resolve T.D.'s problem.

FAMILY PRACTICE RESIDENT: Do some patients have recurrences of the more severe illness, mastitis with fever and systemic symptoms?

DR. OGLE: They do. This problem is more unusual and difficult to treat. Lawrence suggests three underlying possibilities in explaining recurrences: (1) ductal abnormalities or persistently poor drainage of a lobe, (2) chronic nipple fissures or cracks, and (3) inadequate length or spectrum of antibiotic therapy.¹ Her approach to such recurrences includes appropriate antibiotic therapy for two weeks, a review of the history, and observation of nursing, maternal rest and stress-management assessment. She has also found that culture of the breast milk and of the infant's oropharynx and nasopharynx useful in some instances.

MS. DAVIS: To summarize, in cases of sporadic puerperal mastitis:

1. Breast-feeding at frequent intervals should continue. Even if a mother has decided to wean, she should wait until the mastitis has resolved.
2. Mothers should recognize the early signs of mastitis—local pain, heat or redness of the breast, malaise, or fever—and know when to seek help.
3. Early treatment increases the likelihood of a shorter, less severe course of mastitis, and it may prevent the development of infectious complications including abscesses.

DR. OGLE: I suspect that many family physicians may not develop the level of expertise needed to manage difficult or unusual problems of breast-feeding. Awareness of the issues that need to be considered and of the options available can be important in the advice we give to patients. In this area of clinical care, as in all others, the recognition of our limitations and the development of appropriate referral sources can be very valuable.

A newly formed board, the International Board of Lactation Consultant Examiners, is now offering a board-certification examination for lactation consultants. When problems arise that call for expertise and a substantial commitment of time and effort, the involvement of a certified lactation consultant (IBCLC) in the health care team should be considered.

MS. DAVIS: A typical lactation consultation involves a home visit, a lactation history, and observation of a feeding. Written suggestions are given to the mother, and follow-up telephone calls are scheduled to check on the resolution of the problem(s) and to make additional suggestions, if needed. A report of the consultation is then sent to the patient's physician.

DR. OGLE: Lactation consultation is a new resource that can be very valuable in the management of complex or recurrent cases of mastitis as well as other breast-feeding difficulties.

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